[0014] Like labels are used to refer to same or similar items in the drawings.

DETAILED DESCRIPTION

[0015] RSRQ measurements may, as noted, be performed using different types of measurements. The new RSRQ may provide an RSRQ metric that more accurately reflects the instantaneous load in for example low load conditions, compared to the old RSRQ definition. These two RSRQ metrics types may also have different behavior with respect to amount of handovers, radio link failures, and the like. Although using the new RSRQ metric may provide some benefits when more aggressive offloading strategies (for example, to a small cell) are sought, the old RSRQ metric may provide more stable performance. As such, there may be a role for both types of RSRQ metrics at a UE.

[0016] The two RSRQ metric types may, as noted, produce different behaviors/results given similar conditions. Moreover, some legacy UE may support the old RSRQ but not the new RSRQ, while other UE may support the new RSRQ metric and/or the old metric. This environment may lead to a more complicated network operation, so the network may need to account for the different UE behaviors with respect to RSRQ, and, as such, provide different sets of configuration information for each RSRQ measurement type. For example, the old RSRQ measurement type may have some parameters, thresholds, and/or other configurations that are different from the new RSRQ metric type.

[0017] Although some of the examples refer to an old RSRQ measurement and a new RSRQ measurement, these two types are merely examples as other types of RSRQ and/or metrics may be used as well.

[0018] In some example embodiments, the network, such as a base station, may signal one or more adjustments (for example, offsets, changes, or deltas) to the UE. The UE may then be required to apply the adjustments in order to use the new RSRQ measurement or apply the adjustments to the conditions associated with the RSRQ measurement. The adjustments may, in some example embodiments, be specific to for example one or more cells, carriers, and/or measurement events. For example, the network may signal to the UE an adjustment to a threshold that triggers at the UE event reporting to the base station. To illustrate by way of an example, the network may signal an adjustment to an RSRQ threshold used for RRC Event A5 Event (serving cell becomes worse than a first threshold and a neighbor cell becomes better than a second threshold). In this example, the network may provide the first and second thresholds to the UE, but these thresholds may be specific to the old RSRQ measurement, but the adjustments (or offsets) may be used to adjust the first and second thresholds to values corresponding to the new RSRQ measurement.

[0019] In some example embodiments, the network may explicitly signal the UE with an indication to use the old RSRQ or new RSRQ. In some example embodiments, the network may implicitly signal which type of RSRQ measurement should be performed at the UE. For example, the presence (or absence) of the adjustment information (which is sent by the network) may also be used as an implicit indication to the UE regarding which metric to use for RSRQ measurements. For example, if the network provides the adjustment information to the UE, this may implicitly indicate to the UE that the new RSRQ measurement should be used. This adjustment may also enable the UE to adjust the baseline configuration for the old RSRQ (for example to operate in accordance with the new RSRQ metric). Similarly, if the network does not provide the adjustment information to the UE, this may also implicitly indicate to the UE that the old RSRQ measurement should be used.

[0020] However, if the UE does not receive any adjustment or indication concerning which RSRQ metric to use, the UE may, in some example embodiments, implement a default configuration, such as use the old RSRQ metric. Moreover, this default to use the old RSRQ measurement may be implemented even when the UE supports the new RSRQ metric.

[0021] Rather than provide signaling offsets for both connected and idle modes, the new RSRQ metric may, in some example embodiments, be defined for connected mode only, so that in idle mode a UE may use the old RSRQ definition even when the UE supports the new RSRQ definition.

[0022] Alternatively or additionally, the new RSRQ may, in some example embodiments, be configured in the idle mode as well. For example, the UE may be signaled and/or configured for the new RSRQ in idle mode in a radio resource control (RRC) Connection release message (for example, using existing settings from RRC Connected mode). This may help ensure fewer changes to idle mode.

[0023] In some example embodiments, the network may signal (via dedicated signaling or a broadcast) one or more adjustments, such as offsets, that a UE may be required to apply in order to use the new RSRQ measurements and/or the thresholds used to evaluate event triggering (in connected mode) or cell selection (re-selection or suitability in idle mode) when the new RSRQ is being measured. This signaling may enable a more consistent system level behavior among a plurality of UE using the old and/or new RSRQ as well as simplify associated network signaling to configure the RSRQ types. For example, the presence of the one or more offsets may, in some example embodiments, also be an indication to the UE regarding which RSRQ metric to use when the UE supports both the old and new RSRQ metric. Specifically, a legacy UE would not be signaled the offset in connected mode, nor would this legacy UE decode or understand the signaling extensions in the idle mode, so the legacy UE behavior would be unchanged. On the other hand, a UE which supports the new RSRQ may be signaled the offset in connected mode, and would understand the signaling extensions in the idle mode.

[0024] When a new RSRQ metric is to be used at a UE, a corresponding adjustment or offset may be defined as well for the new RSRQ measurement and/or an associated condition, threshold, configuration, and the like. As noted, the adjustment may be a value to adjust a threshold (for example, thresholds used in RRC Event reporting as noted above) to take into account the use of the new RSRQ, rather the old RSRQ. This may enable the network to for example use common/baseline measurement configuration definitions to signal all of the plurality of UE in such a way that only one common set parameters are needed but can be adjusted by offsets to accommodate the new RSRQ measurements. In this way, the same common measurement configuration definitions may be signaled to a plurality of UE, some of which may implement the old RSRQ measurement and some may implement the new RSRQ measurement, but in the case of the new RSRQ measurement an adjustment (for example, an offset, a change, a delta, and the